PART 1: GENERAL

1-1 DESCRIPTION: The Work of this Section includes furnishing all materials, labor, equipment, and supervision required to perform the following:

A. Replacement of all existing gutter downspouts, (approximately 30 downspouts of various lengths and configurations), elbows, hardware and accessories to match existing gutter downspouts, elbows, hardware and accessories. Replacement of existing downspout collector heads is not within the scope of this Contract.

B. Replacement of all existing metal gutter-to-downspout outlet tubes (approximately 30 locations).

C. Routing-out and cleaning of all downspouts and drain piping to street.

D. Solder, make watertight & test all existing joints at metal gutters to remain at all roofs.

E. Replacement of approximately ten (10) lineal feet of 6" diameter hanging half-round gutter at location indicated on the Drawings.

1-2 RELATED WORK:

A. Division 1-General Requirements
B. Section 06210 Carpentry And Millwork
C. Section 07540 Fluid Applied Membrane Roofing System

1-3 QUALITY ASSURANCE:

A. Standards: American National Standards Institute (ANSI); American Society for Testing Materials (ASTM); Sheet Metal & Air Conditioning Contractors National Association (SMACNA), Copper Development Association (CDA).

B. Workmanship: Use only skilled and experienced personnel, carefully supervised, in such a manner as to construct weather-tight sheet metal work. Foreman shall provide evidence of experience of the successful installation of similar combinations of metal gutters and metal downspouts on historic buildings in the past

C. Workers completing work of this section must provide evidence using heated coppers for soldering. Open flame torches are not permitted on this project.

1-4 SCHEDULING AND COORDINATION: Perform the work of this section and other sections in the optimum sequence to prevent damage to, or interference with, other work.

1-5 SUBMITTALS;

A. Shop Drawings: For each type gutter and downspout, submit shop drawings of appropriate scale, showing taper for flow. Show methods of forming, jointing, nailing, and securing metal to form units, including all joint details and waterproof connections and dimensions.

B. Two copies of manufacturer's installation instructions and recommendations.

C. Material Samples:

1. Submit one sample of gutter outlet tube riveted and fastened to flat copper stock of same gauge as existing gutters.

2. Submit 2'-0" length of formed downspout complete with soldered seams. Showing one typical bend.

3. Submit samples of gutter straps, brackets, downspout hangers, and bolts and screws. Submit one of each type required.

1-6 PRODUCT HANDLING: The Contractor shall deliver and use all new products. All packaged materials shall be delivered in unbroken packages with the manufacturer's name, brand, and material standard indicated plainly thereon. The Contractor shall use care during delivery, storage, and installation from soiling, mechanical damage, contract with ground, and exposure to water or high humidity conditions.

PART 2: MATERIALS

2-1 SHEET METAL:

A. Copper: ANSI/ASTM B370-84a, cold rolled temper, weighing 16 ounces per square foot, unless otherwise noted.

B. Lead Coated Copper: ASTM B101-83, Type I, Class A, soft or hard temper. Copper sheets, cold rolled, minimum weight 20 ounces per square foot.

2-2 FASTENERS

A. Nails: stronghold copper type, flat head, barbed, No. 12 Stubs gauge, length as required.

B. Screws: FS FF-S-107C, self-tapping sheet metal type.

C. Rivets: Material, type, and size as recommended by sheet metal manufacturer.

D. Bolts: FS FF-B-575C. Material, stainless steel, hex or square head.

E. Nuts: FS FF-N-836D. Material, stainless steel, hex head.

F. Elastic Cement: FS SS-C-153C, Type I or II.

G. Other Metal Accessories: provide sheet metal fasteners, clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, of size and gauge required for performance.

2-3 EXPANSION ANCHORS

A. FS FF-B-588C.

2-4 SOLDER: ASTM B-32, alloy grade 50A, 50% tin, 50% lead.

2-5 FLUX

A. Manufacturer's standard, phosphoric acid type.

2-6 SEALANT

A. FS TT-S-227E, Type II, Class A, or FS TT-S-230A, Type II, or manufacturer's standard, one part polysulfide, silicone, or polyurethane type.

2-7 ACCESSORIES AND HARDWARE: As recommended for the intended application by the Contractor and approved by the Contracting Officer.

2-8 DOWNSPOUT STRAINER BASKETS

A. Gutter strainer: Copper wire cage-type strainer sized to fit into outlet tube mouth at bottom of gutter.

2-9 FABRICATION

A. Shop fabricate all gutters, gutter outlet tubes, downspouts and accessories to the greatest extent possible following details on approved shop drawings.

B. Cleats: Configuration, sizes, shapes and locations to match existing. Minimum width, 2 inches. Same material and as sheet metal, 16 ounces per square foot.

C. Downspouts: Configuration, sizes, shapes and locations to match existing. 4 inch diameter round corrugated with corrugated elbows, offsets and spouts as required, 16 ga. copper, fabricate longitudinal joints with flat lock seams.

D. Gutter Outlet Tubes: Outlet Tubes: Make of heavy gauge copper pipe of sufficient length to extend a minimum of 3” into leaders. Braze a 2” wide flange ring of 32 ounce lead coated copper to upper end of tube.

E. Downspout Hangers: Configuration, sizes, shapes and locations to match existing. 1/16 x 1-1/4 inch flat stock (minimum) of the same material as the downspouts, "U" shaped with 3 inch long legs fastened to masonry.

F. Gutter strainer: Copper wire cage-type strainer sized to fit into outlet tube mouth at bottom of gutter. Fabricate for waterproof and weather resistant performance with expansion provisions for running work sufficient to permanently prevent leakage, damage, or deterioration of the work.

G. Form work to fit substrates and true to line and levels as indicated.

H. Form exposed sheet metal work without excessive oil-canning, buckling, or tool marks.

I. Seams: Fabricate non-moving seams in gutter linings with ¾” locked and soldered seams.

J. Tinning and Soldering: Soldering on the building shall be completed with well heated coppers only. No open flame torches will be permitted on this project. Tin all surfaces of uncoated metal in contact with

solder. Wire brush all surfaces of coated metals in contact with solder to produce clean, bright surfaces. Sweat solder thoroughly into seams, completely filling the seam full width. Upon completion of soldering, remove all traces of flux residue, and if required, apply a neutralizing wash followed by a clean water wash.

K. Soldering may be used only to fill and/or seal joints and shall not be relied upon for mechanical strength.

L. Exposed Edges: Fold back edges to form hems (3/8" minimum).

PART 3: EXECUTION

3-1 PREPARATION: Examine all eave conditions for areas to which this work will be installed and make necessary corrections prior to commencement of work. Inspect, repair and replace deteriorated wood roof decking and gutter framing to provide sound a sound substrate for metal gutter liners.

A. Verification: Prior to commencing work, Contractor shall verify all shapes and dimensions of surfaces to be covered by field measurement.

3-2 SEAMS: Solder all seams to ensure water tightness. Follow relevant SMACNA gutter and flashing details for bends, seams, joints and cleats.

3-3 INSTALLATION- HANGING GUTTER

A. Install gutters straight and true to line and level. Maximum variation shall not exceed 1/8" in 10'-0".

B. Fasten gutter securely to gutter brackets using spring steel wire fasteners.

C. Inspect gutter fro proper drainage to downspouts

D. Install hanging gutter so that they are watertight, free from visible waves, buckles, dents, and other defects of material and workmanship which would affect strength, durability, or appearance. Joints shall be locked and soldered.

3-4 METAL GUTTER-TO-DOWNSPOUT OUTLET TUBES

A. Remove existing dirt, debris, coatings and membrane coatings from vicinity of all existing metal gutter-to-downspout outlet tubes.

B. Remove existing metal gutter-to-downspout outlet tubes in a manner designed not to damage existing getter surfaces and configurations. Remove downspouts as required.

C. Install drop gutter outlet tubes, riveted and soldered in place, above all locations of downspouts. Rivet (spaced maximum of 3" o.c.) and solder flange to gutter lining.

D. Install appropriately sized basket type strainer in the downspout leaders.

E. Leave all work leak-proof. Plug drop outlets, fill gutter with water and let stand overnight to test for leaks. Re-test after correcting all detected leaks. Insure all outlets are unplugged upon conclusion of

testing.

3-5 DOWNSPOUTS:

A. Remove and salvage existing downspouts for Government use.

B. Install new downspouts at indicated locations. Telescope upper sections into lower sections 1-1/2 inches minimum, rivet and solder. Elbow downspouts away from buildings at open downspout ends. Install downspout hangers at downspout tops, bottoms, and horizontal joints and at 8- foot maximum on center. Secure straps to wall with masonry anchors approved by the Contracting Officer. Except where downspouts are open ended, extend 3 inches minimum into storm drain hub and close opening with Portland cement grout. Trowel top surface of grout and slope away from downspout.

C. Install downspout section through cornices to match existing configurations. Provide water-tight metal sleeve through cornice, using same material as gutters. Install downspout to be continuous through cornice, leaving sufficient clearance between sleeve and downspout to allow for differential expansion and contraction. Install downspouts plumb and true to line and level. Insert lower end into existing subsurface drain hubs.

D. Install downspouts so that they are watertight, free from visible waves, buckles, dents, and other defects of material and workmanship which would affect strength, durability, or appearance. Profiles, bends and intersections shall be sharp, true, and even. Joints shall be locked and soldered.

E. Fasten with straps anchored into existing holes.

F. Leave all work leak-proof. Plug drop outlets, fill gutter with water and let stand overnight to test for leaks. Re-test after correcting all detected leaks. Insure all outlets are unplugged upon conclusion of testing.

3-6 ROUTING OF DOWNSPOUTS AND PIPING

A. Clean and rout-out all existing downspouts and drain piping with power-driven rotary steel cable and propeller equipment, to street or catch basin to assure free and unobstructed drainage of rainwater.

3-7 MAKE WATERTIGHT EXISTING GUTTERS

A. Inspect all existing gutters for leaks and failing seams and identify all areas of deficiencies to the Contracting Officer for inspection. Remove existing paint and fluid-applied membrane coatings to inspect and repair gutter seams suspected of leaking. Solder, repair, make watertight & test all existing joints at metal gutters to remain at all roofs.

3-8 TESTING AND CLEANUP

A. Leave all work leak proof. Prior to final acceptance by Contracting Officer, newly installed and reinstalled components must be shown by Contractor to be securely installed, leak proof, and, if applicable, adjusted so as to not pond water.

B. Clean off all solder and flux residue from the repaired sheet metal fabrications prior to reinstallation.

C. Re-mortar outlets of downspouts into drain pipe boots if extant. Insure that no debris is left in newly installed components. Flush or otherwise remove any debris from all components to insure the free

passage of water.

D. Leave the work area free of all debris and accumulated matter.

END OF SECTION